

*FROM PATTERNS TO PROSPERITY:
A REVIEW OF RACHLIN'S
THE SCIENCE OF SELF-CONTROL*

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The Science of Self-Control (Rachlin, 2000) presents a clear overview of research and theory on self-control, emphasizing important recent research by Rachlin and his students on temporally extended behavioral patterning as an aid to curbing impulsive decisions. We found the book well suited as a textbook in a graduate seminar on self-control, particularly because it lucidly presents several provocative ideas about self-control, decision making, addiction, and general theories of behavior. Of particular interest are his discussion of the "primrose path" to addiction and his behavioral research on the "prisoner's dilemma" as it relates to self-control. Although we take some issue with teleological behaviorism, the theory of behavior advocated by Rachlin, we recommend this book to anyone interested in self-control.

Key words: self-control, choice, behaviorism, teleological behaviorism, addiction, impulsiveness

Howard Rachlin has spent much of his illustrious career exploring the science of self-control, the subject of this fascinating new book. In our opinion the book may be appreciated in at least four overlapping ways. First of all, this is a textbook on self-control suited for an advanced undergraduate or graduate class. Second, it is a theoretical and empirical primer for understanding self-control, including some useful general applications to self-control in our everyday lives. Third, it is a forum for presenting some intriguing principles about behavior, especially as related to self-control. And finally, it serves as a vehicle to advocate a broad general theory of behavior, teleological behaviorism. We consider each of these four facets of the book in turn, concentrating on the final two, and most general, facets.

The book appears to be a natural for use in an advanced seminar. But there is no substitute for experience and, as luck would have it, one of us was scheduled to teach a grad-

uate seminar in self-control in the fall term of 2000. One of the reading assignments (which covered about 4 weeks of the course) was *The Science of Self-Control*. The class included four graduate students, three advanced undergraduates, and, occasionally, the second author of this review. The book inspired lively and provocative discussions that helped make the class a success. The students did not always agree with Rachlin's assumptions and assertions, but the disagreements generated illuminating arguments about the principles that govern impulsive behavior. The arguments ranged from the specific (Rachlin's treatment of alcoholism) to the very general (his presentation of teleological behaviorism, which we discuss at the end of this review). Many of the book's examples involve discussions of alcoholism. Indeed, we would recommend this book as ancillary reading for seminars on addiction. Most of the students, as well as the present authors, disagreed with Rachlin's assessment that occasional ("social") drinking is a "higher valued pattern" of behavior than "teetotaling" is. Rachlin makes a persuasive case that the recovered alcoholic runs into serious trouble, invariably falling off the wagon, when he tries to "move up" from a state of abstinence to one of occasional drinking. He embellishes Herrnstein and Prelec's (1992) "primrose path" process to account for the fall from the wagon and also shows how moderate behavioral restructuring may make sobriety easier to maintain. But few of us were willing to make the initial

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assumption that social drinking is perceived as the higher valued pattern. Moreover, this is an assumption that would likely raise red flags with groups that proselytize for abstinence. In any event, the principles of self-control articulated in this book, including the diagrammatic account of the primrose path, have heuristic value, however one stands on the issue of abstinence. From the standpoint of evaluating a book as a useful textbook for a seminar, it is far more important that the book inspires intelligent and heated discussion than that it inspires total agreement. After we completed the book, students were asked what they thought of it. One of the graduate students pronounced it "a good read," an evaluation that met with unanimous approval. We would use this book again next time either of us teaches self-control at the graduate or advanced undergraduate level.

THE SIGNIFICANCE OF EXTENDED PATTERNING IN BEHAVIOR

The heart of *The Science of Self-Control* is, not surprisingly, also the heart of the research program on self-control as explored in the author's laboratory at the State University of New York at Stony Brook: an emphasis on behavioral patterning that can explain instances of effective self-control and can point the way to the design of treatments to replace impulsive behavior with self-control. Rachlin argues persuasively that an appreciation of the relevance of behavioral patterns is mandatory for understanding complex behavior. He asks us to consider a question posed by neuroscientist Jeffrey Grey involving the difference between two alert individuals present in a room in which a Mozart string quartet is being played. One individual has normal hearing; the other is completely deaf. Grey asked what the difference was between these two individuals regarding the Mozart quartet, implying that there is a difference in what was going on inside their heads. Rachlin counters that Grey's question may be answered without resorting to internal unobserved events. He notes,

Although there certainly must be differences between the internal auditory mechanisms of Adam and Eve—physiological differences, un-

derlying the psychological differences between them—the *psychological* difference itself (hearing versus not hearing) rests in Adam's actual behavior over time (his discrimination) and Eve's actual behavior over time (her failure to discriminate). . . . Identifying a mental event with an act at a single moment in time is like identifying a spot of color with a painting. Asking Grey's question is like asking the difference between a Picasso painting and a painting by a kindergarten child, both of which have a yellow spot in the upper-left corner, or asking the difference between the quartet playing the Mozart piece at the moment between movements, when all four members are stock still, and a painted statue of a quartet. On a trivial level, there is no difference. Looked at another way, there is all the difference in the world. You do not have to refer to either spiritual or physiological states to distinguish between mental states, especially when in everyday life we distinguish among mental states all the time on the basis of actions alone.

What sort of actions? Patterns over time. (p. 21)

In a sense, patterning provides the context without which much of behavior would be poorly understood (e.g., Fantino, 2001). But Rachlin goes beyond the theoretical implications of this point and raises a significant pragmatic point. He makes a strong case that patterning is not only a mechanism for better understanding behavior but also offers a powerful technique for modifying behavior. If we can embed our desired behavior in a broader pattern of desired behavior we will greatly enhance its probability of occurrence. A central reason, in Rachlin's words, is that

longer-term patterns are costly to interrupt. Consider again the act of listening to a three-minute song. We do not like to be interrupted in that act, and the closer we are to the end of the song the less we like it. On a more molar level, as we get absorbed in a television program, a play, or a concert, interruption becomes more costly. (pp. 108–109)

The patterning of behavior is important for understanding self-control situations involving "complex ambivalence," as is the case with alcoholism. As Rachlin explains it, in contrast to self-control showed by the child who chooses two candy bars tomorrow rather than one candy bar today, "Sobriety . . . is not commensurable with having a drink and does

not arrive or depart at specific times. The borderline between alcoholism and sobriety is very fuzzy" (p. 57). Sobriety is a temporally extended event, whereas having a drink is a specific action. According to the primrose path explanation, a year of sobriety can be seen as the sum of 365 days of not drinking. Although a period of 365 days of sobriety is valued more highly than a period of 365 days of drinking every day, it is perfectly possible, on any given single day, for drinking to be valued more highly than not drinking. In other words, the contingencies are such that the longer term pattern favors sobriety, whereas an immediate decision favors drinking. Yielding to temptation reduces the value of future drinking; unfortunately, it also lowers the value of competing activities, so that drinking tends to remain a more valued short-term choice. A formerly sober person may follow the primrose path all the way to the point at which drinking finally is less valued than not drinking ("hitting bottom"). At this point, he or she must begin to climb the "straight and narrow path" to sobriety. Alcoholics may go through this process many times. This way of looking at things makes it easier to understand why relapses are so prevalent. However, the primrose path can be avoided by structuring the environment to increase the salience of temporally extended patterns of behavior and their consequences.

Rachlin bolsters his case with diagrams, illustrating the primrose path on Cartesian coordinates with examples that are, for the most part, compellingly intuitive and also by discussing the results of several ingenious experiments conducted with his students at Stony Brook. The case made is a persuasive one. Moreover, there are examples from the applied literature that underscore the utility of embedding the target behavior within an extended chain of behavior (or pattern; e.g., Baer, Peterson, & Sherman, 1967). Indeed, if we reflect on our own lives we can surely come up with examples that support the role that patterning can play in bolstering our self-control. For example, a short time ago we went out to dinner with two friends at a macrobiotic restaurant. We have been on a macrobiotic diet for over 12 years for reasons of health. One of our friends asked why it could matter if we lapsed from the strict dietary regimen on occasion. Before we could answer,

her husband turned to her and said, "You should read Rachlin's book!" The husband had understood Rachlin's message about patterning very well. Of course, exceptions could be made. But ideally even those exceptions should be embedded in a pattern (e.g., allowing only one exception per week). Otherwise the dieter would be on the slippery slope (or primrose path) to not dieting at all.

As already noted, the primrose path presents a problem because the short-term (or molecular) option provides the greater immediate reward but leads to nonoptimal, or even disastrous, longer term consequences. This is the crux of the problem of self-control. According to Rachlin, this problem can be solved, or at least ameliorated, by structuring the choice so that it is embedded in a response pattern (extended over time). There is empirical support for this notion, examples of which appear throughout the book. We discuss one instructive and important example, from a series of ingenious studies on the classic prisoner's dilemma game by Rachlin and his student Jay Brown. Recall that in the typical prisoner's dilemma, a subject can increase the chance of a big payoff on a given trial by not cooperating with a second subject ("defecting" rather than "cooperating"). But such a choice makes it likely that the other subject will stop cooperating also, in which case both subjects will be doomed to a series of minimal payoffs as long as they fail to cooperate. If both subjects cooperate then they obtain a series of intermediate payoffs, the optimal simple strategy in terms of maximizing earnings for both subjects over the entire session. On any given trial, however, a defection by one subject (while the other is cooperating) can produce a large payoff for that subject. Thus, cooperating is a poor strategy unless the other player is also cooperating. Brown and Rachlin (1999) compared the performance of subjects in the standard game with two players ("the together game") and in a game played by a single player ("the alone game"). The two games have identical payoff matrices. For example, in the alone game if the player chooses the lower payoff (e.g., three nickels instead of four) he or she gets the same choice on the next trial. Any time the player chooses the higher payoff (four nickels) a choice between only one or two nickels is available on the

next trial. The player maximizes his overall payoff by always choosing three nickels over four (or one over two), because only then will he have the opportunity to choose between the higher payoffs on the next trial. The same contingencies apply in the together game, except that the consequences of the present choice are passed on to the other player. As Rachlin notes,

The reward for cooperating in the social cooperation version of the game must be discounted not only by the delay before the player's next turn, but also by the probability that the other player will reciprocate.

People's estimation of other people's future cooperation might be expected to be lower than their estimation of the probability of their own future cooperation. For this reason, a player who cooperates with her own future self in the alone game (who consistently chooses the lower current-trial reward) may defect from the interests of her partner in the together game. This, in fact, is what we found. (p. 172)

Brown and Rachlin then proceeded to an experiment in which the key variable was the patterning of trials. As Rachlin notes, the effect of patterning the trials is to broaden the temporal window over which the consequences of behavior may effectively control our decisions. In this study all subjects participated in the together game. The unpatterned-trials condition was equivalent to the together game played in the prior experiments, in that the players had a decision to make on each trial. In the patterned-trials condition, however, each of the subjects playing together made four decisions at once. Out of the other subject's view, he or she indicated on a piece of paper whether, on each of the next four trials, he or she would choose to cooperate or defect. Then the four trials were played out in turn. Brown and Rachlin found a significantly higher degree of cooperation in the patterned-trials condition. These results, as well as others described in this book, make a persuasive case for the role of extended behavioral patterning as an aid to self-control: When a particular desired behavior is part of a longer term pattern, it is more likely to be chosen. In a sense this is nothing very new; Rachlin's own research on commitment and on preference reversal three decades ago (e.g., Rachlin & Green, 1972) pointed to the

importance of structuring one's environment to minimize the likelihood of impulsive behavior. Constructing response patterns is one effective way to accomplish this.

CHOICE AND SELF-CONTROL

Despite the applied implications of temporally extended response patterning, this is avowedly not a "self-help" book, as Rachlin takes pains to state in his Introduction. Actual methods of instituting behavioral patterning to enhance self-control and monitoring one's adherence to these patterns are not emphasized. Although the book is not the best choice for a layperson looking for a handbook on behavior change, the author is a bit too modest in his disclaimer. Readers already familiar with principles of self-control, such as commitment, self-reinforcement, stimulus control, token economies, fading, and record keeping (some of which—particularly commitment—are discussed in the text), should be able to see readily how effective behavior maintenance programs could be instituted. Rachlin's analysis offers potentially powerful solutions to problems involving impulsive behavior.

Rachlin was among the first investigators of self-control to recognize it as a special case of choice (immediate small reward vs. a larger delayed reward) and to point out that behavior involving self-control must therefore obey the normal laws of choice (e.g., Rachlin & Green, 1972). It is not surprising that a comprehensive discussion of self-control inevitably involves discussion of some general principles of behavior. For example, Rachlin equates commitment with a reduction in freedom, an equation that we believe holds in only a narrow sense. Rachlin asks,

Why does soft commitment increase self-control? When we commit ourselves to a behavioral pattern, we are reducing our future options, hence the potential variability of our future behavior. As soon as we embark on a particular behavioral pattern, we have abandoned all other potential patterns. The difference between the prisoner and the free person is that the free person may potentially do what the prisoner can do, *plus* other things.

A pigeon presented with the choice between a smaller-sooner reward and a larger-

later reward may consistently and monotonously prefer the former. If at an earlier time, however, the pigeon had committed itself to the larger-later reward, it would have reduced the potential, if not the actual, variability of its behavior. In other words, it would have reduced its freedom. Commitment *means* reduction of freedom, and freedom *means* potential behavioral variability. Thus commitment *means* reduction of potential behavioral variability. (pp. 125–126)

Strictly speaking, we have no quarrel with this passage. However, *freedom* is not always used to mean “potential behavioral variability.” It may also be used to connote the means for attaining one’s long-term goals. And in this sense of helping us to achieve our goals, commitment can enhance freedom by liberating us to succeed. By restructuring our environment to facilitate reaching our goals, we are paradoxically increasing our freedom. Often, restricting variability in our immediate behavior allows greater variability (or, at least, a greater range of options) in the future (the long-term pattern); failing to restrict immediate variability may narrow the options for future behavior. This is certainly true for the alcoholic or addict. It is true even in the familiar setting of graduate training, in which students must temporarily narrow the range of topics on which they will work in order to successfully complete dissertations and, eventually, receive degrees.

Another provocative issue concerns Rachlin’s favorable view of our tendency to be influenced by *sunk costs*. Rachlin notes,

To a large extent . . . everyday human life is improved by the tendency to preserve a pattern of behavior once it has begun—to stick with earlier decisions, with resolutions, with promises we have made to other people and to ourselves, to finish the job we started—in other words, to be influenced by sunk costs. (p. 142)

In a certain sense his position is refreshing to those of us who solemnly warn of sunk-cost effects in our lectures on the bounded rationality of human decision making. When sunk costs influence decision making, a fallacy is said to occur (the sunk-cost fallacy or the Concorde fallacy), or we say that “good money” is being thrown after “bad.” Consider the following classic example from Arkes and Blumer (1985):

Assume that you have spent \$100 on a ticket for a weekend ski trip to Michigan. Several weeks later you buy a \$50 ticket for a weekend ski trip to Wisconsin. You think you will enjoy the Wisconsin ski trip more than the Michigan ski trip. As you are putting your just-purchased Wisconsin ski trip ticket in your wallet you notice that the Michigan ski trip and the Wisconsin ski trip are for the same weekend! It’s too late to sell either ticket, and you cannot return either one. Which ski trip will you go on? (p. 126)

Most subjects select the Michigan trip even though they expect to enjoy it less, because they have invested more in it. Similar examples abound in our experience. In fact, Rachlin’s lucid account of the attraction of gambling involves an example of the sunk-cost effect (though not so identified by Rachlin). He summarizes one section of his analysis of gambling by noting that

the force underlying the attraction of gambling is a tendency some of us have to organize strings of wins and losses into substrings of so many losses (ranging from zero to infinity) followed by a win. People who are attracted to gambling ignore repeated losses until they finally cap them off with a win. *Gamblers treat a string of losses as an investment; the eventual win is the return on their investment* [italics added]. (p. 162)

One could interpret this “investment” as a sunk-cost effect in which the gambler is unwilling to abandon his investment until it results in a “win.” Some evidence for this comes from an anecdote that appeared in Randy Cohen’s *New York Times Magazine* column “The Ethicist” on January 28, 2001. The writer had observed two cousins play a slot machine; after the first had played for hours, the second took over and won a large payoff on her first try. The first cousin felt strongly that the winnings should be split 50-50. Evidently, she regarded her hours of play as an investment capped off by her cousin’s payoff. In addition to anecdotal evidence for the sunk-cost effect and the evidence from paper-and-pencil experiments such as the one with the conflicting ski trips (Arkes & Blumer, 1985), powerful support for the sunk-cost effect comes from the behavior-analytical research on persistence of commitment reported by Goltz and her colleagues (e.g., Goltz, 1993, 1999). In these cases persistent, pat-

tern-following behavior is manifestly maladaptive. However, Rachlin's examples and thesis are important reminders that persistent, pattern-following behavior, under the correct circumstances, may be highly adaptive. As Rachlin points out, "As in any self-control problem, there is no inherently right or wrong answer" (p. 141). Without complete access to the information relevant to the problem at hand, it is difficult to determine whether an appropriate decision should involve persistence (pattern following, associated with self-control) or responsiveness to the immediately present (molecular) contingencies. The decision maker often lacks complete information about the context surrounding the choice, thus making the selection difficult. This question of the conditions under which subjects should persist in a pattern of behavior constitutes a promising area for future work with both humans (as in Arkes' and Goltz's laboratories) and nonhumans (we are developing a pigeon analogue of the sunk-cost effect with Anton Navarro in our laboratory; see also Arkes & Ayton, 1999).

In any event, Rachlin is surely correct that persistent behavior often assists us in achieving our goals; this, in turn, most likely contributes to sunk-cost errors. Having learned that pattern following and persistence lead to rewards, we may be too quick to misapply the lesson learned. Indeed, Goltz's (1993, 1999) research demonstrates the profound importance of the subject's history in the tenacity with which commitment is pursued. An optimal application of self-control would involve the ability to commit to a pattern of behavior and, when appropriate, to abandon a pattern that has lost its utility.

Nevin and Grace (2000) have suggested a parallel between Rachlin's (1995) view of self-control as a temporally extended pattern and their own principles of behavioral momentum. For example they note that Rachlin has

argued that self-control involves an extended pattern of engagement in high-valued behavior (e.g., a healthy lifestyle) that persists despite occasional tempting alternatives, even though these alternatives, considered individually and locally, have a higher value than individual components of the pattern.

We suggest that Rachlin's extended pattern is analogous to sustained responding in the initial link of a chain schedule in that, from a

molar perspective, continued access to the terminal-link reinforcer (analogous to health) depends on continued initial-link responding (analogous to moderate drinking, low-fat diet, etc.) throughout the experiment. (Nevin & Grace, 2000, p. 88)

The parallels among the principles of behavioral momentum, Rachlin's emphasis on extended patterns of behavior, behavior on chain schedules, and instances of sunk-cost responding are appealing. Similarly, behavioral momentum and self-control have been separately related to preference on concurrent-chains schedules of reinforcement (e.g., Grace & Nevin, 1997; Navarick & Fantino, 1976; Nevin & Grace, 2000; Rachlin & Green, 1972). In all of these cases, although the broad parallels are appreciated, the extent of the concordance, particularly when quantitative theories are involved, is by no means agreed on (e.g., see the various commentaries in Nevin & Grace, 2000). But the role of temporal context (including the kinds of extended temporal patterning emphasized by Rachlin) appears to be fundamental: To appreciate the likelihood of occurrence of a particular behavior or preference for one of two or more available outcomes, it is essential to know as much as possible about the temporal context in which the behavior or choice is embedded (e.g., see Fantino, 2001).

Rachlin's treatment of gambling is one of the high points of his insightful book. He makes three essential points, each of which is worth summarizing here. First, as many studies have shown (e.g., Fantino, 1967; Herrnstein, 1964), variable delays to rewards are preferred to fixed delays to rewards, and they generate the kinds of rapid, compulsive behavior that characterize gambling. Second, Rachlin advances his "string theory," as discussed above. A critical point here is that the net value of a string of gambles ending in a win is not computed until the string ends. But this means that the loss or gain in a short string (those more likely to produce gains) will be realized sooner than the loss or gain in a long string (more likely a losing string because a single win follows a string of losses). Immediate outcomes have more impact than delayed ones. In the same vein, because delayed outcomes are discounted in their effects, the gambler's losses will be subjectively discounted. This analysis may provide a big

part of the answer to the question of why gamblers gamble despite the unfavorable odds: Subjectively, the odds are not so long. But there is more to gambling than subjective odds, as Rachlin emphasizes in his third point. As anyone who has known (or has been!) a compulsive gambler is aware, the “excitement of winning” can be a powerful emotion. Literature has vividly chronicled this excitement, as illustrated by Fyodor Dostoyevsky’s novella *The Gambler* (1866/1917) and Frederick Barthelme’s contemporary novel *Bob the Gambler* (1997). Rachlin discusses this problem and possible solutions.

TELEOLOGICAL BEHAVIORISM

The Science of Self-Control embeds its discussion of self-control within the theoretical framework of teleological behaviorism, a viewpoint increasingly associated with the author (e.g., Rachlin, 1992, 1999, 2000). In previous discussions of teleological behaviorism, Rachlin has said that to

justify saying that a lever press is an operant, it is . . . necessary that the rat press the lever *because* it is food deprived . . . just as my going to the cash machine is practically justified by the fact that I need money and that I can get it at the cash machine. Explanation of the lever press in terms of its consequence is teleological explanation and . . . depends only on external behavioral observation. (Rachlin, 1999, p. 274)

There are important implications that may be drawn from this and similar passages. First, without appropriate deprivation Rachlin is apparently unwilling to acknowledge the occurrence of an operant response. We would submit that there are legion examples of non-deprived organisms emitting operant responses. However, an implication that appears to be even more central to the heart of Rachlin’s teleological behaviorism is the emphasis on “external behavioral observation.” The following passage is also from Rachlin’s (1999) review of Rowland Stout’s (1996) book on a “teleological approach to action”:

The search for internal causes is a search, not necessarily in the wrong direction but, according to Stout, in a nonbehavioral direction. Is there a way, consistent with behaviorism, to account for behavior with no easily identified environmental causes?

If you are stopped at a corner, the light turns green, you take your foot off the brake, you press the accelerator pedal, and the car doesn’t move, it makes sense to open up the hood and look for some mechanical dysfunction. But if you are a passenger in the car and under the same conditions the driver keeps his foot on the brake you would not look inside his head (either to his nervous system or cognitive system). Assuming that the driver was not suffering from sudden paralysis, you would ask . . . why he should have kept his foot on the brake (perhaps there was a pedestrian about to cross). That is, you would do as behavior therapists are (or should be) trained to do: You would look in the environment for the determinants of his behavior. Or, to put it another, better, way, you would look for the overlying process, however widely extended in time, into which this bit of behavior fits (the driver’s concern for pedestrians—itsself an extended pattern—dominating his desire to get where he is going). What Stout is saying is that those of us who take this path are the true psychologists; it is we, not the cognitivists or physiologists, who are most directly studying mental life. (p. 276)

Rachlin distinguishes between the cognitive psychologist’s emphasis on internal causes and the teleological behaviorist’s emphasis on patterns of behavior extended over time. Although we are in general agreement with Rachlin on this point, we suggest that the more general term *context* serves just as well as *patterns over time*. Moreover with enough context (or detailed patterns) one could probably explain all behavior (recall too, Skinner’s 1957 account of his dinner with Alfred North Whitehead during which the great philosopher asked Skinner how he might explain the utterance “No black scorpion is falling upon this table”; with enough context a plausible account would be possible; pp. 456–460). In our view, whether the emphasis is on context or on patterns over time, the account is far more satisfying than one based on unobservable internal causes (which are arguably not accounts at all). Rachlin’s emphasis on the explanatory power of behavioral context is well illustrated by the following example:

You might say that there is a difference between the man who intentionally swings a hammer and the man who accidentally swings a hammer—even though the two men are behaving alike. And, you might add, the differ-

ence lies inside them. Again, while it is true that something inside people must mediate behavioral differences, the difference between intention and action *is* behavioral. The difference between a man purposely swinging a hammer and a man accidentally swinging a hammer can be resolved not by looking inside him but by looking at more of his behavior. A man accidentally swinging a hammer will not be hammering a nail or laying a floor. (Rachlin, 2000, p. 60)

This principle is used often in interpreting behavior, including by jurors hearing evidence in court. A potential problem with Rachlin's presentation of teleological behaviorism is its apparently unabashedly goal-directed character. In this book Rachlin does not make clear the extent to which the emphasis on final cause (as exemplified by his remarks quoted above, about the cash at the cash machine) depends on consequences (the final cause) previously experienced. In preferring a physicalistic model to account for apparent purpose, we share a preference expressed by Charles Darwin, Clark Hull and B. F. Skinner (see Fantino & Logan, 1979, chap. 2, for a discussion). Ostensibly purposive, goal-directed behavior may be understood within the framework of natural science by observing that we behave not because of expected consequences but because of the consequences that have followed similar behavior in our pasts. Although our behavior may appear to be goal directed (we visit the ATM *because* we want cash), these goals and expectations are themselves the result of prior interactions with our environment (we have obtained cash at ATMs in the past or a bank clerk has given us instructions on how to do so). The members of our graduate seminar all concluded that Rachlin's was a purposive account that treated consequences as causal variables. It is unlikely that Rachlin intends this, however, as indicated by the following:

You could say, for example, that I went to the cash machine because I needed money and knew I could get it at the cash machine, or you could say that I went to the cash machine because under similar conditions (wallet contents, appointments, etc.) I frequently went to the cash machine in the past. (Rachlin, 2000, p. 110)

Rachlin then clearly states his support of the

latter possibility. His account differs from ours only in that we would emphasize the additional role of past reinforcement of the behavior at the cash machine whereas Rachlin appears to stress only the discriminative stimulus aspects of the situation.

In any event, we would probably all agree that feelings of purpose and of goal direction and the expectation of success are all rooted in our reinforcement history. As such they may be taken as superfluous—almost epiphenomenal—to a parsimonious account of behavior. On the other hand, it is difficult to argue that internal events play no role in overt behavior. For example, it may well be that the drug addict under treatment is more likely to take drugs after a prolonged period of thinking about them than after a period of thinking about an upcoming basketball game. That these two episodes of thinking can be understood as a function of the addict's reinforcement history does not necessarily render them irrelevant to a complete account of behavioral causation. This is a difficult and far-reaching question that cannot be settled here (see also Epstein, 1996, p. 34; Staddon, 2001). In our view, the powerful and intriguing analysis of self-control presented in *The Science of Self-Control* has broad applicability, whether or not we accept the author's view of teleological behaviorism. This is indeed "a good read."

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